Dominion Virginia City Hybrid Energy Center

Case-by-Case Maximum Achievable Control Technology (112(g)) Permit

DEQ Response to Comments Document

June 16, 2008

On February 8, 2008, the United States Circuit Court of Appeals for the District of Columbia (Court) issued an opinion vacating the Clean Air Mercury Rule and overturning the United States Environmental Protection Agency's (EPA) decision to delist electric generating units as sources subject the Maximum Achievable Control Technology (MACT) standards under §112 of the 1990 Clean Air Act Amendments.[1] The mandate for this decision was issued on March 14, 2008. As a result of the mandate, new electric generating units (EGUs) that are major sources of Hazardous Air Pollutants (HAPs) are required to conduct a case-by-case MACT preconstruction review.

In anticipation of the mandate, Dominion Virginia Power submitted an application on February 15, 2008, in accordance with 9 VAC 5 Chapter 80 Article 7 for the proposed Virginia City Hybrid Energy Center (VCHEC) located in Wise County, Virginia. The Department of Environmental Quality (DEQ) proposed a draft permit for public comment on March 4, 2008. Notice of the permit and the public hearing were published in the *Bristol Herald Courier*, the *Kingsport Times-News* and the *Clinch Valley Time* on March 4, 2008. DEQ accepted written comments on the draft permit from March 4, 2008 to April 18, 2008. A public hearing was held on April 3, 2008 in St. Paul, Virginia.

The April 3, 2008, public hearing was attended by a total of 110 people, 27 of which offered oral testimony. Of the 27 people who offered testimony, 6 were locally elected officials and included:

Virginia Senator Phillip Puckett – Tazewell
Virginia Delegate Bud Phillips – Castlewood
Wise County Supervisor Robert Adkins – Wise
Wise County Supervisor J.H. River – Wise
Wise County Supervisor Robert Robbins - Wise
St. Paul Town Councilwoman Rita McReynolds – St. Paul

[1] *See* New Jersey v. EPA, 517 F.3d 574 (D.C. Cir. 2008)

Twenty-six of the people spoke in favor the plant and one person expressed opposition to the plant.

DEQ received 249 written comments. Environmental groups commenting on the permit included the following:

- Southern Environmental Law Center (SELC), including:
  - Appalachian Voices
  - Chesapeake Climate Action Network
  - National Parks Conservation Association
  - Natural Resources Defense Counsel
  - Sierra Club
  - Southern Appalachian Mountain Stewards
- Chesapeake Bay Foundation
- Wythe Conservation Network

The National Park Service (NPS) and the EPA Region 3 office also submitted written comments.

Other written comments consisted of form letters, other letters and e-mails all in opposition to the plant being constructed.

Response to Comments

The concerns expressed are summarized below, with the Department's response immediately following each item.

Issue 1: *Commenters expressed concern over the health effects of mercury and the added health effects that could be caused by mercury emitted from the proposed VCHEC.*

Response: DEQ shares the commenters' concern regarding the health effects of mercury. The primary concern for human exposure to mercury is through the consumption of contaminated fish. Fish can become contaminated when mercury in the atmosphere (from both natural and anthropogenic sources) is deposited on the land and water. Mercury is deposited in waterways through direct deposition or from runoff from the land. Some water bodies in Virginia possess characteristics favorable for the formation of methylmercury, a highly bio-accumulative form of mercury. These characteristics include low dissolved oxygen, high organic matter, and low pH, and are most prevalent in "backwaters" of the southeastern portion of the Commonwealth. The methylized form of mercury becomes available to plants and animals in their food chain, and can bioaccumulate in fish tissue where it may be transferred to humans via fish consumption.

In 2006 DEQ began a comprehensive assessment of mercury emissions and their impacts within the Commonwealth of Virginia, pursuant Section 2, 2006 Acts of Assembly, Chapters 867 and 920. This assessment will be used to determine whether there is justification to undertake additional measures to control mercury emissions in Virginia.

The assessment includes a mercury air emissions data analysis, a modeling assessment of mercury deposition, an analysis of the mercury deposition impact on fish tissue concentrations, as well as information on the human health risks from consuming methylmercury contaminated fish.

DEQ will use the results of the deposition portion of the study to examine the following: (1) the contribution of air emissions to mercury deposition for the list of Virginia's "impaired" water bodies and other mercury sensitive waters; (2) the impact of Virginia's Electric Generating Unit sector's mercury emissions on mercury deposition in Virginia, including an evaluation of the benefits of federal and state laws and regulations impacting emissions; (3) the impact of Virginia's non-EGU mercury emissions on mercury deposition in Virginia; (4) the individual impact of a selected number of Virginia facilities to local (i.e., hot spot) and regional scale mercury deposition.

The results will be used to estimate the effects that changes of deposition rates of mercury to watersheds could have on local fish tissue contamination levels and to assess the human health risks from consuming methylmercury contaminated fish. The study will be completed and a final report available in October 2008.

The proposed MACT permit requires the most stringent controls currently available for minimizing mercury emissions including flue gas desulfurization (FGD), fabric filtration, and activated carbon injection (ACI). As a result of public comment and information received regarding mercury emissions test results from several similar circulating fluidized bed combustors, the mercury emissions limit in the draft MACT permit has been revised to 1.4×10^{-6} lb/MWhr and 8.19 lbs/yr. The annual emission limit is calculated as:

$(1.4 \times 10^{-6}$ lb mercury /MWhr) x (668 gross MW/hr) x (8760 hr/yr) = 8.19 lb mercury /yr

At this emission rate, mercury emissions from the VCHEC project are expected to be less than 0.25% of the total mercury emissions from utilities and industrial sources in Virginia. Attachment A provides a comparison of mercury emissions for Virginia's existing electric generating units (EGUs) with the proposed VCHEC facility. Projected emissions (2010) for the existing facilities include co-benefit mercury reductions as a result of the requirements from the Clean Air Interstate Rule (CAIR). Although the

VCHEC facility is ranked 10 for Virginia EGU's, the facility's mercury emissions represent less than 1% of the total mercury emissions projected for all EGUs in Virginia.

Additionally, the Standards to Protect Health and the Environment (Section 112(f) of the Clean Air Act which is known as the "Residual Risk" Program) requires the EPA to assess the risk to public health remaining after the implementation of a MACT standard. If the "residual risk" for a source category does not protect public health with "an ample margin of safety," the EPA must promulgate health-based standards for that source category to further reduce HAP emissions. The EPA is required to set more stringent standards if necessary to prevent adverse environmental effects (considering energy, costs, and other relevant factors). The EPA must set residual risk standards no later than 8 years after promulgation.

At this time, no residual risk analysis of the VCHEC is required. Additional information on the residual risk future applicable requirements is available at the following link.

http://www.epa.gov/ttn/atw/residriskpg.html

Issue 2: *Commenters assert that DEQ failed to establish a mercury emission limitation that is at least as stringent as the emission control that is achieved by the best controlled similar source. Commenters provided a list of similar facilities for consideration and specifically cited two of them as having lower mercury emissions than the proposed mercury emission limit for the VCHEC facility*[2]*. Commenters state that the MACT limit cannot be keyed to a percentage reduction in emissions but must instead require the same per-unit emission rate as the best controlled similar source.*

Response: DEQ concurs that the MACT determination for a new facility must be at least as stringent as the level of control found at the best controlled similar source. "Similar source" is defined as a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed major source such that the source could be controlled using the same control technology.[3] In determining MACT for VCHEC, DEQ determined "similar source" to be circulating fluidized bed (CFB) boilers, because the CFB design is unique in its ability to burn the combination of fuels proposed for this project (run-of-mine coal, waste coal or "GOB", and a maximum of 20% biomass in the form of waste wood). A list of facilities considered in this determination is included as Attachment B. The list contains some pulverized coal (PC) units as well as the "similar source" CFB units because DEQ staff evaluated PC boilers for possible technology transfer. The most

[2] *The facilities cited as having lower mercury emission limits are the Reliant Energy Seward Station in East Wheatfield Township in Indiana County, Pennsylvania("Reliant") and the Virginia Electric Power Company's (VEPCO) Clover Power Station in Halifax, Virginia ("Clover")*
[3] 9 VAC 5-80-1410

stringent level of control identified for mercury emissions for CFB boilers is a combination of flue gas desulfurization and fabric filters. These controls are required for the VCHEC project and are determined to represent the MACT floor. Additionally, activated carbon injection (ACI) is proposed for the VCHEC project as a beyond-the-floor control. ACI has been previously required for pulverized coal boilers and DEQ determines this control strategy to be transferable to CFB boilers.

The permitting agency has more discretion in establishing a numerical emission limit for mercury than suggested by the commenters. The agency must consider whether the limit established is achievable in practice over the lifetime of the facility being constructed. Test results from similar facilities must be reviewed to determine whether they are replicable and sustainable. The courts have not precluded consideration of control efficiency in determining whether controls will be able to achieve reductions; in fact the Court of Appeals for the D.C. Circuit has upheld EPA's assertion that it must ensure that emission standards are achievable "under [the] most adverse circumstances which can reasonably be expected to recur,"[4] and (2) that "evaluating how a given MACT technology performs is a permissible means" of estimating the actual performance.[5]

Based on comments received, DEQ has reviewed mercury emissions reported for the Reliant and Clover facilities, and believes Reliant to be the best controlled similar source for the purpose of Article 7. The mercury emissions estimate of 17 pounds per year for the Clover facility was taken from data collected by DEQ for the Virginia mercury study described above. This emission estimate was made using an approved calculation method for the Toxics Release Inventory.[6] For coal combustion sources, the guidance provides various percents of mercury released to air depending on the type of boiler, coal and control equipment. For the Clover facility, Dominion used 3.59% mercury released to air which is the percent contained in the guidance for pulverized coal boilers burning bituminous coal with fabric filter and wet flue gas desulfurization (FGD) scrubber control. Using this methodology, a combined coal throughput of 2,541,006 tons of coal and average mercury content in the coal of 0.10 ppm, mercury emissions from the facility were estimated by Dominion to be about 17.11 pounds for 2005.

DEQ staff has recently learned that stack tests for mercury were performed at Dominion's Clover and Mecklenberg facilities at the request of EPA for development of the Clean Air Mercury Rule. Both of these boilers are pulverized coal boilers and neither burns waste coal. At Clover, the results of the test were 0.3529 lb/TBtu mercury emitted.

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[4] Sierra Club v. EPA, 167 F.3d 658, 665 (D.C. Cir. 1999) *citing* National Lime Assn. v. EPA, 627 F.2d 416, 431 n. 46 (D.C. Cir. 1980). *See also,* National Emissions Standards for Hazardous Air Pollutants for Source Categories; Portland Cement Manufacturing Industry, 64 Fed. Reg. 31,898, 31,915 (June 14, 1999).
[5] National Emissions Standards for Hazardous Air Pollutants for Source Categories; Portland Cement Manufacturing Industry, 64 Fed. Reg. 31,898, 31,915 (June 14, 1999).
[6] EPA Guidance (Emergency Planning and Community Right-to-Know Act – Section 313: Guidance for Reporting Toxic Chemicals: Mercury and Mercury Compounds Category).

This is equal to annual mercury emissions of about 25.26 lb/yr. The average mercury content in the coal during the tests was 0.159 ppm. Therefore, for the Clover facility, emissions estimated for the mercury study and tested emissions were well below the mercury emission limit in the Clover permit, which is 3.1 lbs/day. At Mecklenberg, testing showed 9.59 lb/TBtu mercury emitted (97.7% control of mercury). There is no mercury emission limit in the permit for Dominion's Mecklenberg facility.

Emissions reported for the Reliant facility are based on emission testing conducted by Pennsylvania DEP. The test used the Ontario Hydro method which is considered a valid test method for quantifying mercury emissions from CFB boilers. However, the sampling period was less than is prescribed by the test method (96 minutes versus a minimum of 120 minutes) and the test was not conducted for compliance purposes but rather for development of a mercury emission factor. Because the construction permit for Reliant does not contain an emission limit for mercury, there has been no long term testing of mercury emissions from the facility. Results from the short term testing should be taken into consideration for establishing a numerical emission limit, but it is appropriate to also apply a margin of safety to ensure that the limit established is achievable and sustainable throughout the life of the permitted equipment.

The revised VCHEC permit contains a mercury emission limit of 8.19 pounds per year. This is equal to the most stringent limit (1.4×10^{-6} pounds per megawatt-hour) identified in a permit for a similar facility (Robinson Power Company in Robinson Township, Pennsylvania). The emission limit proposed for VCHEC, like the emission limit established by Pennsylvania DEP for the not yet operational Robinson facility, is higher than the short term emission rate measured at Reliant, in order to ensure that the emission standard is achievable under the most adverse circumstances which can reasonably be expected to occur over the life of the equipment. For additional discussion see responses to Issues #4 (possible adjustment of the limit) and #8 (beyond-the-floor analysis).

Issue 3: *Commenters state that DEQ failed to consider EPA's 2004 proposed MACT floor and EPA's 2004 determination of the emission control achieved in practice by the best-controlled similar source.*

Response: DEQ has considered EPA's 2004 proposed MACT floor for Electric Generating Units and EPA's 2004 determination of the emission control achieved in practice by the best-controlled similar source, as well as subsequent proposals for regulation of mercury emissions from new electric steam generating units.

The limits EPA proposed for MACT development (January 30, 2004, 69 FR 4652) were changed before being promulgated May 18, 2005 (70 FR 28606) as new source performance standards (NSPS). Rationale for the changes included new data sources as well as cost considerations (cost is an allowable criterion for NSPS but not for MACT

floor determinations). On October 28, 2005, (70 FR 62213) EPA published a notice of reconsideration on the NSPS limits, explaining that their earlier analysis contained certain inconsistencies and errors. The NSPS standards were revised on June 9 2006 (71 FR 33388) based on reanalysis of data and including additional data not available in the earlier rulemaking.[7]

Because the 2004 proposed emission limits were never promulgated, there is little if any data available to demonstrate whether those emission levels are in fact achievable. A review of permits issued for CFB boilers did not reveal any similar facility subject to a limit this stringent. Very limited data available from testing at one facility (Reliant Seward) indicates that this level of emissions may be achieved on a short term basis but does not provide sufficient data to demonstrate that the limit is achievable in practice over the lifetime of the facility being constructed.

As discussed in response to Issue #2, the emission limit proposed for VCHEC is as stringent as the most stringent emission limit identified for any similar source.

Issue 4: *Commenters object to language in the permit that would allow adjusting the mercury limit upward in the event Dominion is unable to achieve the emission limits established in the permit, claiming that this language would allow circumvention of MACT limits.*

Response: The permit requirements for possible adjustment of the MACT limit were included to clarify the process by which the numerical emission limit could be changed in the event it cannot be achieved. The first step in establishing a MACT standard is to identify the most stringent control (or combination of controls) used to minimize emissions from a similar source. This review resulted in the requirement that VCHEC install and operate flue gas desulfurization and fabric filters. As a beyond-the-floor technology, Dominion has agreed to install activated carbon injection. While this technology has been installed on pulverized coal boilers and is expected to operate effectively on CFB boilers (including those burning waste coal), the transfer of this technology is not yet demonstrated.

Nothing in the permit allows Dominion to avoid installation and operation of the MACT technology. Establishment of a numerical emission limit at least as stringent as the best controlled similar source is not straightforward. As discussed in the response to Issue #2, the courts have upheld EPA's interpretation that this language allows inclusion of a safety factor to ensure that the standard will be achievable under the most adverse circumstances which can reasonably be expected to recur. In at least one case, the Court

[7] Attachment C provides a more detailed chronology of EPA's rulemakings for mercury emission limits for electric utility steam generating units.

of Appeals for the D.C. Circuit determined that a control technology requirement could be sufficient without quantification of the HAP reduction achieved:

> The EPA is under no obligation to achieve a particular numerical reduction in HAP metal emissions; it must reduce their emission only to the level "achieved" by the best performing facility or, for existing sources, to the level achieved by the median of the best performing 12 percent of facilities. 42 U.S.C. § 7412(d)(3). If PM control is the only means by which facilities "achieve" reductions in HAP metal emissions, then the EPA may require PM control without quantifying the reduction in HAP metals thus achieved.[8]

With numerous control strategies involved for VCHEC, DEQ has sought to establish the lowest numerical limit achievable for VCHEC on an annual basis, taking into account the most adverse conditions reasonably expected, and has reduced the emission limit for mercury to 8.19 lb/yr. There is limited test data available showing that a similar facility has been able to control mercury emissions to this level on a short term basis (less than 2 hour intervals) but to our knowledge, there is no long term data showing this limit is being achieved on a continuous basis. Because there is a lack of data demonstrating that any facility has continuously demonstrated compliance with a limit as low as that established by this permit, the allowance for a possible adjustment to the limit has been retained. This possible adjustment is appropriate since there has not yet been a demonstration of successful ACI operation on a CFB boiler burning waste coal. Should it be necessary for Dominion to seek an adjusted limit, the permit amendment process would allow for full public participation in re-establishment of the emission limit.

Issue 5: *Commenters argue that alternative approaches for energy production and conservation should be considered. Some suggested coal from other states should be burned since contaminant levels would be lower, while others suggested using Virginia coal to produce energy through alternative technology such as Integrated Gasification Combined Cycle (IGCC) or Super-Critical Pulverized Coal boilers. Other commenters suggested use of wind farms, energy efficiency studies, and energy conservation techniques as non-polluting alternatives to construction of a coal burning power plant.*

Response: The applicant did consider alternative approaches for energy production before deciding on a circulating fluidized bed combustor. As part of their PSD application, the applicant provided an analysis and statement regarding IGCC as an alternative technology. The applicant indicated they specifically chose circulating fluidized bed coal combustion technology for a variety of reasons including the available

[8] National Lime Ass'n v. EPA, 233 F.3d 625, 639 (D.C. Cir. 2000) cited in Sierra Club v. EPA, 353 F.3d 976, 984 (D.C. Cir. 2004).

fuel types and Virginia legislation that encourages and provides incentives for the development of a coal fired electric generating facility in the Virginia coal fields, which the Virginia General Assembly determined to be in the public interest.[9] During the PSD review process, DEQ determined IGCC technology to be neither technologically nor economically feasible in situations where considerable fuel flexibility is necessary. Such is the case with the Virginia City Hybrid Energy Center, which is designed to utilize readily available run-of-mine coal, to remediate coal waste piles, and to combust renewable fuel such as biomass.

Pulverized coal (PC) boilers are generally believed to be less flexible with regard to fuels than are circulating fluidized bed combustors. Use of waste coal and run-of-mine coal in a PC boiler would be impossible without extraordinary coal cleaning measures. This type of combustion would then result in more waste coal piles as well as emissions from the cleaning and transportation processes; it could also increase water requirements for system operation and environmental controls.

The circulating fluidized bed technology chosen for the Virginia City Hybrid Energy Center was selected with consideration of the types of available fuels (run-of-mine coal, coal refuse, and biomass) and other resource availability. DEQ recognizes the potential air quality benefits of wind farms, but does not have the legal authority to require Dominion to utilize this technology. Construction of a coal fired facility that utilizes Virginia coals is consistent with the public interest and incentives established by the Virginia General Assembly in Virginia Code §56-585.1. In addition it is unclear that a wind facility, which generates electricity only when the wind blows, could be a substitute for the proposed plant which is designed to operate continuously (i.e. 24 hours/day, 7 days/week).

Energy conservation measures are typically addressed as a matter of public or corporate policy and are beyond the scope of the Article 7 (112(g)) permit process. Additionally, consideration of the need for the product of a proposed facility is not part of the Article 7 (112(g)) permitting process. The State Corporation Commission (SCC) is the regulatory body having the authority to assess the need for and benefits of a proposed electric generating facility. A source must have SCC approval prior to beginning construction. VCHEC was granted its SCC license March 31, 2008 for an initial term of two years. DEQ's role in the Article 7 permit application is to assure all applicable state and federal regulatory requirements regarding the emission of HAPs are met.

Issue 6: *Commenters state that DEQ failed to establish the MACT floor and to conduct a thorough beyond-the-floor analysis, including consideration of non-air quality health and environmental impacts. Commenters requested DEQ staff consider additional means of reducing emissions from the proposed project such as coal cleaning (washing)*

[9] *See* Va. Code § 56-585.1.

and/or a more stringent application of activated carbon injection. Specifically identified concerns included: impacts from mountaintop removal mining, effects of pollution on threatened and endangered species in and around the Guest and Clinch Rivers, effects of water withdrawal from the Clinch River, environmental impacts on federally protected parks and wilderness areas, and contribution of mercury emissions to the Chesapeake Bay.

Response: DEQ concurs that control efficiency alone should not be used to establish the MACT standard where the best performing plants achieve their emission levels not just by using technology, but also by selecting cleaner inputs. In this case, the MACT floor was found to be installation of flue gas desulfurization and fabric filters (see response to Issue #2). This combination of controls was used by the facility with the lowest identified mercury emission rate, and was found to be the most stringent employed by a similar source (Reliant). Activated carbon injection is required as a beyond-the-floor technology, not yet operational as a mercury control on any CFB. As a result of comments received, coal washing has also been evaluated as a possible beyond-the-floor technology. Coal washing is not required as part of the MACT floor because the best controlled similar source (Reliant) does not use coal washing. Selection of CFB technology allows utilization of waste coal (also known as "GOB"), which is the detritus remaining when bituminous coal is cleaned. During the cleaning process, a portion of the coal washes into the GOB; although the GOB has a lower Btu content than the washed coal, it is still useable as a fuel in a CFB boiler. DEQ reviewed operational practices at other facilities approved to burn GOB, including the Reliant Energy plant in Seward, Pennsylvania and the permitted but not yet operational Robinson Power facility in Robinson Township, Pennsylvania. Reliant is not washing their coal and Robinson Power has no permit requirement for coal washing. DEQ has not identified any similar source controlling mercury emissions using a combination of coal washing with flue gas desulfurization, fabric filters, and activated carbon injection; therefore, consideration of coal washing is appropriately conducted as part of the beyond-the-floor analysis.

In determining whether control measures are required in a beyond-the-floor analysis, DEQ is required to consider the benefit and cost of achieving such emission reduction, taking into account any non-air quality health and environmental impacts and energy requirements.[10] Consideration of "any non-air quality health and environmental impacts and energy requirements" is integrally related to the requirement to consider costs of achieving emission reductions. The D.C. Circuit Court of Appeals has upheld EPA's position that this language does not refer to performing detailed reviews of the impact of such concerns as deposition:

> There is no apparent reason to suppose that Congress would have required immediate consideration of health and environmental impacts caused by,

[10] Clean Air Act § 112(d)(2); National Lime Assn. v. EPA, 233 F.3d 625, 629 (D.C. Cir. 2000).

> say, deposition of HAPs, while postponing consideration of the more direct health and environmental impacts caused by emission of HAPs into the air until the second stage of standard promulgation under the CAA. As discussed, the 1990 Amendments established a two-phase approach to promulgating emission standards. The first phase — at issue in this case — requires a technology-based approach. See 42 U.S.C. § 7412(d). The second phase occurs eight years later and involves a risk-based approach. See id. § 7412(f)(2)(A) (''Emissions standards promulgated under this subsection shall provide an ample margin of safety to protect public health….''). That risk-based analysis requires EPA to consider, inter alia, public health and adverse environmental effects, id. — precisely what Sierra Club contends EPA must consider now with respect to non-air quality impacts. Sierra Club's interpretation would collapse the technology-based/ risk-based distinction at the heart of the Act, undermining the central purpose of the 1990 Amendments — to facilitate the near-term implementation of emission standards through technology-based solutions. In doing so, that interpretation would reintroduce the very problem Congress sought to exorcize — that the pursuit of the perfect (risk based standards) had defeated timely achievement of the good (technology-based standards). EPA's reading of the statute is reasonable.[11]

In the Prevention of Significant Deterioration (PSD) permitting process some of the specific issues raised are addressed from an environmental impact perspective in the "additional impacts analysis". For determining MACT, however, energy considerations and non-air quality environmental concerns raised by commenters are considered within the same context as whether beyond-the-floor controls are considered cost effective for the VCHEC project.

In conducting the beyond-the-floor analysis, several qualitative issues involved with coal washing were examined. Coal cleaning can be an effective method of pollution prevention. However, for the following reasons coal washing would not be in keeping with the goals of this project:

- Waste coal is allowed to be burned in the CFB boilers. One of the goals of the project is to reduce accumulations of waste coal in Southwest Virginia. If coal is washed and the resultant GOB (waste coal) is allowed to be blended back into the mix of fuel combusted by VCHEC, the wastes removed by washing would simply be reintroduced to the fuel supply stream as part of the waste coal supply.

[11] Sierra Club v EPA, 353 F.3d 976, 989 (D.C. Cir. 2004).

- There is no clear evidence that coal washing would result in lowering emissions of mercury or other HAPs. Only mercury contained on the surface of the coal is removed by washing and this form of mercury is captured efficiently by particulate emission controls.
- Coal washing would require additional water and energy resources.

Nevertheless, a quantitative estimate of cost associated with coal washing was provided by Dominion. That estimate, based on the theoretical assumptions that coal mercury content could be reduced 30% by washing and that this reduction would translate directly to a reduction in emissions, showed an incremental control cost of $2.5 million/ lb of mercury removed.

Considering the benefit and cost of achieving such emission reduction, taking into account non-air quality health and environmental impacts and energy requirements, DEQ determines that no additional controls for mercury removal beyond ACI are required as a result of the beyond-the-floor analysis.

Issue 7: *Commenters suggested a minimum threshold requirement for waste coal utilization be placed in the permit in order to justify the higher proposed emission limits.*

Response: The revised mercury limit is reflective of the best performing similar source and does not take into consideration the type of coal being burned. Therefore, DEQ does not consider a minimum threshold for waste coal utilization necessary.

Issue 8: *Commenters argued that MACT limits were not properly established for non-mercury HAPs (specifically HCl and non-mercury metals), and that the HAP content of GOB was not adequately addressed. Additionally, concern was raised that use of clean coal technology can increase emissions of CO2 and polycyclic aromatic hydrocarbons (PAH).*

Response: A limit on particulate emissions serves as a surrogate limit for non-mercury metals. In cases where particulate control is the only means of achieving emission reductions, this practice is well established and has been upheld by the D.C. Circuit Court of Appeals:

> The agency's analysis is not unreasonable. If HAP metals are invariably present in cement kiln PM, then even if the ratio of metals to PM is small and variable, or simply unknown, PM is a reasonable surrogate for the metals-assuming, as both the EPA and the NLA appear to do, that PM control technology indiscriminately captures HAP metals along with other particulates, an assumption about which we say more in the next paragraph. The EPA is under no obligation to achieve a particular numerical reduction in HAP metal emissions; it must reduce their

> emission only to the level "achieved" by the best performing facility or, for existing sources, to the level achieved by the median of the best performing 12 percent of facilities. 42 U.S.C. § 7412(d)(3). If PM control is the only means by which facilities "achieve" reductions in HAP metal emissions, then the EPA may require PM control without quantifying the reduction in HAP metals thus achieved.[12]

The questions then become (for non-mercury metals) whether:

- the best-controlled similar source employs other methods of achieving reductions in emissions,
- there are reasonable beyond-the-floor controls that could be employed, and
- the particulate limit established as the surrogate limit is at least as stringent as the level of control found at the best controlled similar source.

No similar source has been identified as having controls other than particulate controls for non-mercury metals, and a fabric filter is accepted as the best level of particulate control. Because the non-mercury metals have lower boiling points than mercury, they are more readily captured as particulate emissions. Therefore, the concerns and costs which eliminated coal washing as a beyond-the-floor technology for controlling mercury emissions (see issue #6, above) likewise eliminate it as a reasonable beyond-the-floor control for non-mercury metals. There were no other reasonable beyond-the-floor controls identified for non-metal HAP.

The limits on particulate emissions (PM, PM-10 and PM-2.5) are in the range of the lowest emission rates permitted or measured for similar facilities. The permit limits are intended to include sufficient margin of error to be consistently achievable over the life of the units (for further discussion on achievable limits, refer to issue #2, above).

The permit does not impose limits on the HAP content of GOB. In determining whether concentration of HAP in feedstock should be taken into consideration in setting a MACT standard, the D.C. Circuit Court of Appeals has evaluated whether there is a direct correlation between HAP content in the feedstock and HAP content in emissions; likewise, whether there is a direct correlation between HAP emissions and particulate controls:

> Put another way, "PM might not be an appropriate surrogate for HAP metals if switching fuels would decrease HAP metal emissions without causing a corresponding reduction in total PM emissions." The reason is clear: if EPA looks only to PM, but HAPs are reduced by altering inputs in a way that does not reduce PM, the best achieving sources, and what they can achieve with respect to

[12] National Lime Ass'n v. EPA, 233 F.3d 625, 639 (D.C. Cir. 2000).

> HAPs, might not be properly identified. Nothing in the record, however, supports the proposition that switching to cleaner ore will decrease HAPs without a reduction in PM. On the record before us, EPA concluded that ''[s]trong direct correlations exist between the emissions of total particulate matter and metal HAP compounds. Emission limits established to achieve good control of total particulate matter will also achieve good control of metal HAP." As EPA explained, ''[t]he control technologies used for the control of PM emissions achieve equivalent levels of performance on metallic HAP emissions.'' On this record, the use of PM as a surrogate is reasonable, even in light of the potential variability of impurities in copper ore.[13]

Production of hydrogen chloride is driven by the chlorine content of the coal, with emissions reduced by the same control measures as for SO2 emissions. Chlorine content of bituminous coal is higher than subbituminous coal and lignite. Higher HCl emissions also enhance the removal of mercury, as the chlorine oxidizes elemental mercury vapor to a more reactive form of mercury. DEQ agrees with Dominion's contention that MACT for HCl is established as the control suite of limestone injection, flue gas desulfurization, and fabric filtration. The proposed emission limit is 0.0066 lb/MMBtu, applied on a 3-hr average. Our review did reveal two similar facilities with HCl limits which may appear lower than proposed in the VCHEC permit. They are:

- Robinson (Pennsylvania) with a limit of 0.0029 lb HCl/MMBtu. This limit, however, is a 30 day rolling average. The much longer averaging period allows for short term emissions higher than allowed by the draft VCHEC permit, thus the Robinson limit is not necessarily a lower limit.

- Spurlock Unit #3 (Kentucky) with a limit of 0.0035 lb HCl/MMBtu (3-hr average). However, The Spurlock permit has a mercury limit of 0.000019 lb/MWhr, which is significantly higher than the limit (0.0000014 lb/MWhr) proposed here for VCHEC, and a much higher mercury rate than the apparent mercury emission rate measured at Reliant.

[13] Sierra Club v EPA, 353 F.3d 976, 984-85 (D.C. Cir. 2004) *quoting* National Lime Ass'n v. EPA, 233 F.3d 625, 639 (D.C. Cir. 2000), National Emissions Standards for Hazardous Air Pollutants for Source Categories: National Emissions Standards for Primary Copper Smelters, 65 Fed. Reg. 39,326, 39,329 (June 26, 2000) (Supplement), & National Emission Standards for Hazardous Air Pollutants for Source Categories: National Emissions Standards for Primary Copper Smelters, Proposed Rule, 63 Fed. Reg. 19,582, 19,592 (Apr. 20, 1998). Sierra Club argued that HAP content of raw materials should be limited, as it was in the Hazardous Waste Combustor (HWC) MACT. The court ruled that justification for each MACT standard is considered on its own merit (''every tub on its own bottom''), but then clarified that requiring only PM control for HAP was inadequate in the HWC context because feedrate control was also used in the industry to reduce HAP emissions, unlike in the copper smelter industry.

HCl emissions enhance the removal of mercury, as the chlorine oxidizes elemental mercury vapor to a more reactive form of mercury. DEQ has proposed a MACT emission limit for HCl of 0.0066 lb/MMBtu, which is in the range of the lowest HCl emission rates permitted or measured for similar facilities. The HCl emissions which are limited slightly higher for VCHEC than for the Spurlock facility may assist in controlling mercury emissions, for which the VCHEC permit limit is more stringent than Spurlock's. The HCl emission limit is intended to include sufficient margin of error to be consistently achievable over the life of the units and under the most adverse conditions reasonably expected (for further discussion on achievable limits, refer to issue #2, above).

Control of PAH and other organic HAP emissions is achieved through good combustion practice and activated carbon injection (followed by a fabric filter). CO and VOC were chosen as surrogates to represent the variety of organic HAP compounds. Because CO and VOC are good indicators of incomplete combustion, there is a direct correlation between CO / VOC emissions and the formation of organic HAP emissions. Monitoring equipment for CO is readily available, which is not the case for organic HAP. Also, it is significantly easier and less expensive to measure and monitor CO emissions than to measure and monitor emissions of each individual organic HAP. Using CO and VOC as surrogates for organic HAPs is a reasonable approach because minimizing CO emissions will result in minimizing organic HAP emissions; further, EPA has already established precedent by using this approach in other MACT standards.

The optimization of combustion controls and operations is the standard method of controlling CO emissions from coal-fired boilers. Proper design, operation and maintenance of the CFB boilers facilitates complete combustion, and consequently reduces the formation of carbon monoxide and organic HAPs. Because Dominion is approved to burn wood in the CFB boilers, the CO emission limit of 0.15 lb/MMBtu is higher than would be required for a unit burning exclusively coal. However, this limit is lower than some CO emission limits which have been established by EPA as MACT for minimizing organic HAP emissions from combustion processes. DEQ determines the 0.15 lb/MMBtu CO limitation to be the MACT emission limitation for organic HAP for the CFB boilers.

CO2 emissions are not subject to regulation as HAP, and there has been no indication from EPA or a court that CO2 will be regulated as a HAP.

Issue 9: *EPA, Region III's comments advised that the mercury monitoring provisions of 40 CFR Part 75 were affected by the vacatur of the Clean Air Mercury Rule. EPA noted that as drafted, the permit incorporates by reference the requirements of 40 CFR Part 75 for mercury. EPA recommended that the permit establish an independent authority for establishing the continuous monitoring, reporting and recordkeeping conditions for mercury.*

Response: DEQ concurs with EPA's comment. As a result, DEQ extracted the provisions pertaining to mercury from 40 CFR Part 75 and included the requirements as an appendix to the permit. DEQ amended the permit to refer to the appendix rather than to 40 CFR Part 75.

Issue 10*: Commenters questioned whether DEQ had thoroughly reviewed local meteorological patterns and considered whether frequent inversions would result in increased pollutant impacts and air quality violations.*

Response: DEQ recognizes that inversions can lead to pollution being trapped close to the ground, with possible adverse effects on health. In meteorology, an inversion is a deviation from the normal change of an atmospheric property with altitude and is almost always referred to a temperature inversion (i.e., an increase in temperature with height as is present in valley fog conditions).

DEQ believes that the meteorological models (MM5 and CALMET) used in Dominion's air quality analysis are appropriate for assessing impacts from the proposed facility. Specifically, the MM5 model physics options such as precipitation physics, boundary layer process parameterization and atmospheric radiation schemes are designed to replicate the presence of inversions in mountainous terrain.

Additional information regarding air quality analyses conducted by Dominion and reviewed by DEQ can be found in the permitting record for Dominion VCHEC's PSD construction permit.

Issue 11*: Commenters stated that Dominion failed to provide required information regarding design details for the activated carbon injection control system.*

Response: In response to this comment, DEQ requested additional information regarding the ACI control system. The requested information was received on June 4, 2008 and it is included as Attachment D to this document.

Issue 12*: Commenters requested a hearing in the plume area.*

Response: It is DEQ's intention to provide the public an opportunity to be involved in the air permitting process. By holding a public hearing in Wise County, DEQ has met with the public in the vicinity of the proposed project. Many criteria affect the specific location of hearing, including availability of facilities with sufficient space for the expected attendance, handicap accessibility, and willingness of the facility to allow use for the hearing. St. Paul High School was selected as a facility meeting the criteria of public accessibility and proximity to the project. In addition to the public hearing, DEQ accepted comments in writing throughout the comment period which began 30 days prior to the hearing and extended 15 days following the hearing. Materials explaining our

decision (such as the engineering analysis and draft permit) have been available for review at DEQ's Southwest Regional Office in Abingdon, at J. Fred Matthews Memorial Library in St. Paul, on the DEQ website, or by request, and DEQ contact information has been provided in the event additional information was desired.

Additionally, comments were received on two issues (carbon sequestration and ash disposal) which are outside the scope of this permit. These issues were addressed in the response to comments document for the draft PSD permit.